LIBRARY
STATE PLANT BOARD

UNITED STATES

DEPARTMENT OF AGRICULTURE

14 College [illegible]

BUREAU OF
ENTOMOLOGY AND PLANT QUARANTINE
NEWS LETTER

[illegible]

24 [illegible]

VOLUME VI

6

Digitized by the Internet Archive
in 2013

http://archive.org/details/newsletter39no8

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR JUNE 1939

Vol. VI, No. 8 (Not for publication) August 1, 1939

FRUIT INSECT INVESTIGATIONS

More on dichloroethyl ether for control of plum curculio.--Oliver I. Snapp, of the Fort Valley, Ga., laboratory, has just reported on further experiments in the use of dichloroethyl ether for soil treatment against the plum curculio. These experiments were designed to determine whether the water load can be reduced in using dichloroethyl ether on the soil under the spread of peach trees for the control of this insect. They were carried on in soil boxes at the laboratory, 750 curculio larvae being placed in each box. Two dosages of dichloroethyl ether were tested--1/3 fluid ounce and 1 fluid ounce per square yard--carried in quantities of water ranging from 1/2 pint (in which case the dichloroethyl ether was emulsified) to 1 gallon per square yard. With the higher dosage of the chemical, 100 percent mortality was obtained with all quantities of water. With 1/3 fluid ounce of the dichloroethyl ether, the mortality was complete when 1 gallon of water was used per square yard, and 98 percent when the quantity of water was reduced to about 1/2 pint.

Beginning of flight of dried-fruit insects.--Dwight F. Barnes and George H. Kaloostian, of the Fresno, Calif., laboratory, report that operation of a rotary net in a raisin-storage yard from March 2 to April 30 gave data on the beginning of flight of a number of species or groups. The list, with dates, follows.

Ephestia figulilella Greg., March 18
Ephestia elutella (Hbn.), March 30
Ephestia kuehniella Zell., March 16
Ephestiodes nigrella Hulst, March 16
Plodia interpunctella (Hbn.), March 21
Ahasverus advena (Waltl.), March 16
Cryptophagus lepidus Casey (?), March 3
Typhaea stercorea (L.), March 16
Laemophleous ferrugineus (Steph.), March 18
Carpophilus hemipterus (L.), March 6
Tribolium castaneum (Hbst.), April 2
Scobicia declivis (Lec.), March 24
Cnemeplatia sericea Horn, March 17
Enicmus spp., March 26
Plochionus pallens (F.), March 21

Japanese beetle emergence in 1939, preliminary note.--Observations by various members of the staff of the Japanese beetle laboratory at Moorestown, N. J., indicate that general emergence of the Japanese beetle for the season 1939 is from 10 days to 2 weeks later than for the last several years. Although it is as yet too early to definitely compare the infestation during the current year with that of 1938, the early observations indicate that the heavy infestation, as for the last several years, will be centered in the northern half of Delaware, northeastern Maryland, and southeastern Pennsylvania. A very heavy infestation has been noted on the lower Eastern Shore of Maryland, with a considerable defoliation. The infestation in southwestern New Jersey gives early indication of being locally severe. For the first time since 1933 there appears to be some increase in the infestation in the oldest infested area, the New Jersey portion of the Philadelphia suburban area. Throughout most of north-central New Jersey and Pennsylvania north of Philadelphia indications are that the infestation will be somewhat lighter than that of a year ago. In the more northern portions of the area of general infestation emergence has not yet progressed far enough to indicate the general situation. The relatively cool weather during the early part of July has been accompanied in general by less beetle-feeding activity than would be the case in a normal year.

Colonization of an imported parasite of Japanese beetle.--During May and June collection and colonization of *Tiphia vernalis* Roh. was carried on at the Japanese beetle laboratory. Sufficient numbers of female *T. vernalis* were collected from 17 of the established colonies in Pennsylvania, New Jersey, and Delaware to provide for 145 colonies of 100 females each. These colonies were released in the field as follows: Maryland, 40 colonies; New York, 50; Connecticut, 25; Delaware, 10; Pennsylvania, 10; and New Jersey, 10. Representatives of the States of Maryland, New York, and Connecticut cooperated with the Bureau personnel in the colony distribution in those States.

MEXICAN FRUITFLY CONTROL

Fruitfly status in the lower Rio Grande Valley.--Traps in the valley took 3,553 *Anastrepha ludens* Loew and 21 flies were also trapped in the Laredo area. By far the greater number of these flies were young. It was evident that most of them had just recently emerged, as many were poorly colored and only a small number of the females were gravid. The tree-to-tree inspection was completed before the last of June. On several properties "off-bloom" fruit was found to be infested but no larvae could be found in next season's fruit. Heavy rains throughout the area have caused the trees to put on new growth and will hasten the development of the new crop. Other than that caused by rust mites, no insect damage was reported.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Soil depths for white grubs in Wisconsin.--T. R. Chamberlin, Madison, Wis., reports that records are being kept of the depths in the soil at which all white grubs are found. A summary, which is based on all samples taken between April 26 and June 30 in which holes were 20 inches or more deep, is given below. Twenty-three samples aggregating 301 1/40,000-acre holes in 13 fields in the Lamont, Gays Mills, and Fennimore districts of southwestern Wisconsin are included.

Soil depths	Total grubs found	
	Apr. 29-May 16	May 31-June 30
	Percent	Percent
Sod	11.2	71.1
4-10 inches	21.5	21.5
10-15 inches	30.1	7.4
15-20 inches	34.0	.7
20-25 inches	*3.2	*0

*This record is not complete, as many holes were only 20 inches deep.

These records are interesting in that they show relatively few grubs above the plow level between April 26 and May 16, when many sod fields were plowed; consequently plowing during this period had little effect on grub populations.

JAPANESE BEETLE CONTROL

Dutch elm disease scouts recruited from colleges.--Approximately 2,300 men were notified during the week beginning June 5 to report for Dutch elm disease scout training on June 12. Universities and colleges as far west as Illinois were notified of the availability of these jobs and were requested to recommend students, preferably those who had taken courses in the biological sciences and who were adapted to this type of work. Enough men reported to the training schools in Connecticut, New York, New Jersey, and Pennsylvania to make up a maximum force of 1,470 trainees during the week of June 12-17. Approximately 600 of the 1,350 men remaining on June 17 were from those sponsored by the colleges. The quota established for the entire work area is 1,500 fully trained and capable scouts. Nearly 1,000 men did not report for work because of the uncertainty of continued employment in the absence of appropriated funds for continuance of the work beyond June 30, the short notice that was given, and the fact that the $4 per diem rate offered did not prove attractive enough to men who would be obliged to live away from home. The men who reported and were accepted for training have proved to be a very promising lot. About 150 proved unacceptable for the work. Employment of this large number of per diem scouts on regular funds was made possible by the appropriation of $100,000 for Dutch elm disease eradication work in the Second Deficiency Appropriation Bill approved May 2. These men will augment the W. P. A. scouts who were trained in scout schools during the week June 5 to 10.

Scout crews organized in isolated infection areas.--Five regular and 5 W. P. A. foremen were assigned with 16 W. P. A. and 6 regular scouts to systematic scouting in the Indiana area on June 2. The work was started in Marion and Hamilton Counties. Scout school had been held in the Indiana area during the week May 29 to June 3. Scout training was resumed on June 1 in Athens County, Ohio. Eight of the 12 crews allotted to this area were fully organized and started their activities on June 10. Wilting was showing up to an appreciable extent on the latter date, and an average of 15 samples per day were collected. The Ohio scouts on regular funds were organized on June 19 into 2 railroad and river crews and 3 systematic auto-foot crews to scout the Hocking River and the Baltimore and Ohio Railroad from Athens to the Ohio River and to Belpre, respectively, as well as from Athens west toward Chillicothe, Ohio. In the Cumberland, Md., area, 43 men were selected for employment as scouts on June 1. Scouting was started in the Cumberland, Md., and Bolivar, W. Va., areas the week beginning June 5. Very little wilt was showing at that time, but both American and European elm bark beetles were found. By the end of the month the West Virginia area was nearly completed on the first survey. Scouting was also done in Washington, D. C., around the Capitol and the Tidal Basin.

Scouting by autogiro for Dutch elm disease.--By June 5, the five Bureau-owned autogiros had been completely overhauled and were in readiness at the U. S. D. A. Airport at Preakness, N. J., for the Dutch elm disease scouting program. Men to be assigned to the ground crews working in conjunction with the aerial crews attended scout schools in Springfield, N. J., and Poughkeepsie, N. Y. On June 22 a pilot and an observer started aerial scouting in the southeastern portion of the advance survey area in Connecticut. Owing to the heavy elm concentration in the Connecticut work area the progress of the ground crews was slow. Many storm-damaged elms have been sampled and a large number were found to be beetle infested. By the end of the month the aerial scouting crew in Connecticut had covered approximately 60 square miles. The New Jersey advance survey work, combining autogiro and ground crews, is progressing rapidly, owing to the light elm population in the southern part of the State. Perimeter scouting by ground crews was performed along the major highways located in the cities of Reading, Harrisburg, Sunbury, Wilkes-Barre, Kingston, West Pittston, Scranton, and Waverly, Pa., and Albany and Binghamton, N. Y. Wilt was not apparent in the latter areas, the major symptom observed being staghead and flagging. About 20 miles northeast of Binghamton, N. Y., the staghead condition of the elms diminished and only a few stagheaded elms showed discoloration when sampled. The *Scolytus* population in the Albany area was found to be low, although *Hylurgopinus* was numerous.

Newly discovered Dutch elm disease infections.--Among the most important of the first-record infections reported in June were confirmations in the town of Saugerties, in Ulster County, N. Y., and the town of Pine Plains, Dutchess County, N. Y. These are the northernmost infections thus far discovered. Contiguous to the older New York infected zone, a confirmation was reported from the town of Newburgh, in Orange County. In New Jersey scouts sampled two elms, later confirmed as infected, in Hamilton Township, Mercer County. One of these is located just outside the city limits of Trenton. Discovery of infected trees in the townships of Falls and Solesbury, Bucks County, Pa., also added these political subdivisions to the infected zone. The first confirmation in the Athens, Ohio, area for 1939 was received on June 16. This tree is located on a farm approximately 1½-miles southeast of the 1938 diseased tree, on the Athens State Hospital property. A second case of the disease, on the same property, was confirmed on June 26.

W. P. A. Dutch elm disease workers laid off.--Pending allotment of further funds in the new fiscal year, all security-wage employees were terminated on June 30 until recalled. Field activities were continued by the per diem and appointed personnel only.

New Jersey corn borer infestation.--European corn borer infestation has been abundant in sweet corn and a few small infestations have been reported in potatoes. Larvae of the second instar were the most advanced stage reported by the end of June.

Japanese beetle control activities on the Eastern Shore of Virginia.--A scout assigned on July 7 to survey for early beetle emergence at Cape Charles, Va., reported plenty of beetles present on the first day out. The adults were approaching peak flight by July 14. A constant stream of complaints was received at the Salisbury, Md., office concerning beetle damage to corn and other farm crops. In preparation for the seasonal quarantine effective June 15, 326 refrigerator cars had been examined and sealed prior to that date on the Eastern Shore of Virginia. Two shippers at Atlantic, Va., have constructed certified packing houses so that they may ship potatoes under certification without fumigation after loading. One has screened storage space and the other has his entire packing house screened. About 150 cars arriving at Cape Charles via ferry were screened during June prior to their movement through the heavily infested area. Most of these arrived at night and were screened before the daily flight period.

Trapping Japanese beetles at airports.--Japanese beetle traps were set at a number of the major airports on air routes out of Newark, N. J. During May and June traps were placed at the transport air bases at Atlanta, Ga., St. Louis, Mo., Winston-Salem, Greensboro, Charlotte, and Raleigh, N. C., and Dayton and Columbus, Ohio. Arrangements were made to place traps at the municipal airports at Chicago and Indianapolis early in July. Two inspectors will also be stationed at the Newark, N. J., airport as soon as beetle flight assumes swarm proportions in that section. These inspectors will work with all commercial lines, National Guard officers, and individuals connected with private airplane firms in an effort to obtain their cooperation in keeping all plane openings closed during the flight period, except as necessary to enter for cleaning and check-up purposes and for the loading of passengers.

Soil treating at isolated beetle infestations.--During June, 80 acres of soil were treated for control of the Japanese beetle in cities in Illinois, Indiana, and Ohio. In Chicago, where soil treatment started on May 22, 52.8 acres had been treated up to June 30, of which 43.2 acres were sprayed in June. At Fort Wayne, Ind., 20.1 acres were treated from June 12 to 27. Treating at Logansport, Ind., begun on May 25, continued until June 9, with a grand total of 16.05 acres covered, 9.05 acres of which were treated during the month. Treating started at Belpre, Ohio, on June 29, the treatments continuing into July. At Marietta, Ohio, 6 acres were sprayed during the period June 13 to 28.

Methyl bromide fumigation supplanting lead arsenate soil treatment of nursery plots.--Throughout the Japanese beetle regulated area the releading of nursery plots was approximately one-half of the acreage treated in 1938. The analyses indicated very little loss of lead arsenate content during the past year in those plots where the dosage was up to requirements last year. A number of the treated plots are being abandoned in favor of the methyl bromide fumigation of nursery stock.

Scouts inoculated.--Scouts working under the jurisdiction of the Richmond, Va., office in Tidewater Virginia, the District of Columbia, and nearby Maryland were inoculated against the Rocky Mountain spotted fever on June 28 at the U. S. Public Health Dispensary, Washington, D. C. A second inoculation was given 1 week later. Dog ticks are prevalent in the area where the men will be scouting.

Japanese beetle found in Bermuda.--Information was received at Washington from T. A. Russell, Director of Agriculture, Paget East, Bermuda, that a living Japanese beetle was found in mid-June in Bermuda opposite the docks where passengers from the United States arrive.

Fumigation of refrigerator cars.--Fumigation of farm products with methyl bromide at the Pennsylvania Railroad yards at Edgemoor, north of Wilmington, Del., was begun on June 16.

New England farm products inspection.--At Portland, Maine, 18 Japanese beetles were removed from beans inspected and certified for shipment by truck to localities outside the regulated area. Twelve beetles were removed from beans inspected at Boston, Mass., for movement to nonregulated points. These infested beans were from New Jersey and Maryland.

Trapping activities.--In June trapping for the Japanese beetle was started in 5 cities in Georgia, 2 in Illinois, 2 in Kentucky, 23 in North Carolina, 11 in Ohio, 1 each in South Carolina and Tennessee, 23 in Virginia, and 8 in West Virginia.

Road-patrol interceptions.--During June, 574 Japanese beetle adults, 24 larvae, and 1 pupa were intercepted at the 26 highway-inspection stations operated in Ohio, Pennsylvania, Virginia, and West Virginia.

Gypsy moth defoliation.--District inspectors have observed defoliation by gypsy moth caterpillars in two small areas in Rockingham and Chester, Vt. Heavy defoliation was reported in the Cape section of Massachusetts, with very heavy feeding on Mount Tom in Holyoke, Mass. Defoliation was also observed in Portsmouth, Hampton, Winchester, Swanzey, and Walpole, N. H. In Maine considerable defoliation was noted in York and Cumberland Counties. Owing to the late hatching of gypsy moth egg clusters, the peak of defoliation will probably not be reached until the middle of July.

Contractor's equipment infested.--Fifty-three gypsy moth larvae were taken from a truckload of contractor's equipment inspected at Monument Beach, Mass., prior to movement to Tivoli, N. Y.

FOREST INSECT INVESTIGATIONS

Wingless aphids overwinter in subfreezing temperatures.--An unusual occurrence of wingless forms of the aphid *Cinara curvipes* (Patch) on white fir was noted during the winter of 1938-39 by C. B. Eaton, of the Berkeley, Calif., laboratory. Three colonies of this insect were found on young fir trees at Hat Creek, Shasta County, in mid-February, when minimum air temperatures between 20° and 25° F. were recorded nearly every day. The aphids survived temperatures as low as 15°, and were exposed to several snowstorms aggregating from 3 to 4 inches at a time with no apparent ill effects. The insects appeared to be actively feeding during the warmer part of the day, when the air temperatures reached 45°to 50°. Colonies caged up early in the spring produced winged adults about the middle of May. So far as it has been possible to ascertain, this is the first time the species has been observed overwintering in the wingless stage under such conditions.

Cylindrocopturus longulus damages Douglas fir reproduction.--This small weevil, which also attacks pine, larch, and true fir in the Pacific coast States, is notably abundant this year on Douglas fir reproduction in the prairie district south of Puget Sound, in western Washington, according to R. L. Furniss, Portland, Oreg. The larvae kill lateral and terminal branches, and in some cases entire trees of small size, by making meandering galleries in the living bark. Damage is most pronounced on poor sites, particularly where the organic top soil is thin and underlain with gravelly subsoil. Trees less than 25 feet high, grown in the open are preferred and seldom are trees over 12 feet seriously affected. Under normal conditions high mortality of young larvae results from host resistance, but in trees of low vigor weevil survival is much greater. It is believed,therefore, that the present outbreak resulted from drought during the growing season of 1938, when all records of moisture deficiency for western Washington were broken.

Defoliation of bitterbrush in Oregon.--A serious defoliation of bitterbrush (*Purshia tridentata*) by the Great Basin tent caterpillar (*Malacosoma fragilis* (Stretch)) on the Deschutes National Forest, Oreg., has recently been brought to the attention of the Portland laboratory and has been investigated by J. M. Whiteside. Bitterbrush rates as one of the most valuable native forage shrubs and is intensively grazed by sheep, therefore its defoliation by these caterpillars represents a serious and important problem in the management and utilization of the range. The present epidemic probably started in an area of about 640 acres in 1937, increased very greatly in 1938, and has become so widely spread in 1939 that artificial control measures are out of the question. Caterpillars are in evidence on three ranger districts but are most heavily concentrated on two grazing allotments on the Fort Rock Ranger District. On portions of these allotments 100-percent defoliation was the usual condition found in 1939.

Places of pupation for Great Basin tent caterpillar.--While collecting cocoons of the Great Basin tent caterpillar on bitterbrush on the Deschutes National Forest, Mr. Whiteside took notes on the more important places of pupation and the number of cocoons collected therein. Cocoons were found under boards, limbs, and logs, on the plants, and in other places, but the greatest number were collected (1) inside the caterpillar tents, (2) in stools of Idaho fescue grass, and (3) under the loose bark of ponderosa pine stumps. The results of 150 random collections on June 1-2 are given below.

Location	Trials	Cocoons	Per trial	
			Mean	Greatest
	Number	Number	Number	Number
Pine stumps--------	50	96	1.92	8
Grass stools--------	50	122	2.44	8
Caterpillar tents---	50	168	3.36	12

The first caterpillars pupate inside the tents. In the grass stools most of the cocoons were collected close to the ground line in the dead and dry grass. The cocoons in the decaying stumps lie close to the cracks and edges of the bark.

Natural factors check pandora moth epidemic on Arapaho National Forest.--Although the pandora moth infestation in lodgepole pine on the Arapaho National Forest, Colo., spread over a much larger area than last year, the caterpillars are not numerous enough in any area yet observed to cause serious defoliation, according to reports by N. D. Wygant, of the Fort Collins, Colo., laboratory. Abnormally low winter temperatures were believed to have killed many of the overwintering larvae and at present a wilt disease is taking a heavy toll. It is estimated that approximately 25 percent of the caterpillars have been killed this spring by this disease. Caterpillars affected by this disease become watery and limp. The caterpillars are nearly mature at this time (July 1) and will soon be leaving the trees to pupate in the soil. A few moths have started to emerge from the pupae that ordinarily would have emerged last year. It is not yet known whether they will be numerous enough to start a serious second brood.

Pandora moth outbreak in ponderosa pine near Black Hills.--J. A. Beal reports that an outbreak of the pandora moth in ponderosa pine, dangerously close to the Black Hills area, has recently been called to the attention of the Fort Collins laboratory. Specimens of the moths, eggs, and newly hatched larvae have been collected and forwarded to the laboratory by R. A. Phillips, area forester of the Soil Conservation Service, and by Supervisor E. A. Snow, and Ranger Russel Smith, of the Harney National Forest. The area lies from 8 to 10 miles northwest of Osage, Wyo., and there is estimated to be about 2,000 acres of heavily defoliated pine. Moths are flying now but are becoming scarcer and their dead bodies litter the ground. Newly laid eggs occur thickly on the foliage over a wide area and some of the young larvae are beginning to hatch. A few living pupae can still be found in the ground. Residents of Newcastle, Wyo., report that last summer thousands of the moths were seen flying around the street lights in the city. This would indicate that there might have been a flight of moths last year, as well as this year, although no 2-year-old larvae have yet been found. The outbreak is about 25 miles west of the Harney and Black Hills National Forest boundaries and there are continuous stands of ponderosa pine timber connecting the area and these forests.

Notes on European spruce sawfly.--P. B. Dowden and W. F. Sellers, of the New Haven, Conn., laboratory, report as follows on the progress of European spruce sawfly studies in the town of Marlboro in southern Vermont: "Thirty-six cloth-bottomed trays measuring 3 by 3 feet were placed in a 1/5-acre plot to note feeding and larval mortality. About 2,600 dead sawfly adults were collected on these trays. The trays have been cleaned daily and, although there is a tremendous larval population in the plot and frass from feeding larvae is very abundant, there has been very little larval mortality as yet. On June 30 most of the larvae were in the fourth instar, although fifth-instar larvae and earlier stages were common. Thirty-six similar trays were also placed in a second (permanent) observation plot at Marlboro, but the larval population there is apparently insignificant. At least very little frass and almost no larvae have fallen on the trays. On June 23, 12 of these trays were moved to a third location in south Marlboro, where there is a low sawfly population at present. If the infestation moves eastward and southward, as it has up to the present time, this third plot should be infested more heavily later in the season. Forty trees severely defoliated for the first time in 1938 were noted and numbered last fall. Recent examination of these trees showed 10 of them apparently dead. Two of these trees have green tops, but are badly infested by bark beetles. A similar tree was cut and is being held caged to rear bark-beetle adults."

Bark-beetle population light in salvaged logs in hurricane area.--J. V. Schaffner, Jr., New Haven, reports that white pine logs salvaged in the hurricane area and stored on dry sites were examined at several localities in Massachusetts in June. Although bark beetles were more commonly found than in May, the percentage of infested logs is still exceedingly low. Light attacks of ambrosia beetles were found in one or two logs on dry sites at Dover, Dunstable, and Petersham, Mass. At Petersham larvae of Dendroctonus, probably D. valens, beneath bark which was fully exposed to the sun were found to be dead, while larvae beneath bark on the lower, shaded side of logs were alive. A few full-grown larvae, tentatively identified as Pissodes approximatus Hopk., were found in cells beneath the bark of white pine logs. No adults or larvae of cerambycids have been found.

Sawfly on red pine in Massachusetts decreasing.--Mr. Schaffner further reports that few severe infestations of the sawfly "Neodiprion sp. on red pine" were observed this year, although feeding was noticeable on individual trees and groups of trees in many plantations in eastern Massachusetts. Many larvae died, apparently from disease, before becoming full grown.

Larvae of European pine shoot moth may not migrate.--Observations by S. F. Potts indicate that half-grown larvae of the European pine shoot moth are seldom able to migrate successfully from one shoot to another, although they may readily go from one bud to another on the same shoot. This seems to indicate that few if any larvae reach maturity on the shoots of the lower branches, which have only one small bud per shoot, while the chances for survival are much greater on shoots near the upper part of the crown having more than one bud per shoot.

Elm bark beetles fail to infest other hosts in laboratory tests.--The larger European elm bark beetle (Scolytus scolytus F.), the smaller elm bark beetle (S. multistriatus Marsh.), and the native elm bark beetle (Hylurgopinus rufipes Eich.), have been recorded in literature as reproducing on a number of host plants. C. H. Hoffmann, of the Morristown, N. J., laboratory, reports that sections of American and European linden were subjected to attack by adults of S. multistriatus and H. rufipes in a screened cage and also under natural conditions in the field. Both species bored, perhaps fed, in the bark but only a few contacts with the wood surface were noted and no galleries were attempted. D. E. Parker, during his studies of elm insects in England, subjected sections of wild cherry, wild plum, ash, and willow to adults of both S. scolytus and S. multistriatus. Only a few attempts to bore into the bark were made by either species and no gallery formation was attempted.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

New gypsy moth infestation discovered in Vermont.--During the early part of the month a gypsy moth infestation was located in Lincoln, Addison County, Vt., the first ever to have been found in this township.

Sprayers kept in good condition by field mechanics.--Visiting mechanics were responsible, to a great extent, for the smooth operation of spray pumps, because these employees worked on a carefully planned schedule so that every machine was visited at least once a day; and, in a great many instances, twice daily.

Collection of gypsy moth egg clusters for hatching records.--During the spring of 1938, and again during the spring of 1939, C. C. C. foremen collected gypsy moth egg clusters for hatching records. These egg clusters were brought to Greenfield, where the records were obtained. In 1938, 115 egg clusters were collected from 12 different towns and these showed approximately 76-percent hatch; whereas in 1939, 120 egg clusters were collected from 22 towns and these gave an 80-percent hatch.

Weather conditions favorable to spraying.--During the period June 5 to 10, excellent weather conditions permitted uninterrupted spraying in all sections in which this type of work was performed. The days were hot and sunny so that the spray solution dried onto the foliage very quickly.

Ski trails an aid to scouting work in Vermont.--Scouting crews working on the eastern slopes of Mount Mansfield, which lies partly in the township of Stowe, Lamoille County, found the numerous ski trails very useful to walk over in reaching remote sections of extensive tracts of forest land. These trails, which are well defined, are of much help in subdividing the woodland into sections that may be more easily scouted.

Use of small-diameter hose aids in spraying work.--The use of about 300 feet of light, small-diameter hose, directly behind the nozzle, facilitated handling of the hose line and the nozzle, particularly in woodland tracts where the ground was rough and the growth was dense.

Heavy defoliation on woodland growth at Shelburne Falls, Mass.--It was observed during the latter part of the month that a large hillside in this town had from 50 to 100 percent defoliation of woodland growth caused by forest tent and gypsy moth caterpillars. An examination of part of the area showed that most of this defoliation had been caused by tent caterpillars, although a sufficient number of gypsy moth caterpillars were present to cause noticeable defoliation.

Seasonal jobs take many W. P. A. workers in Vermont.--The force of W. P. A. gypsy moth workers in northern Vermont has been dwindling steadily since early in May. Most of these men have resigned to take up seasonal employment, such as farm and mill jobs, work in mines; a few to undertake private enterprises; and a large number obtained employment on road work and other types of construction. It is anticipated that the approaching haying season will take still more from this project.

Few forest tent caterpillars killed by spray.--Observations by field employees in Connecticut indicate that in the areas sprayed for the gypsy moth there is little evidence of killing of forest tent caterpillars, because this insect had ceased feeding before the spray was applied.

Converted sprayers prove to be efficient.--The converted sprayers assembled in part from salvaged parts taken from the old Federal sprayers have proved highly satisfactory. During the last 2 years the gypsy moth project has converted 20 of the obsolete type at the Greenfield, Mass., repair shop. These self-powered units, readily mounted on a 1½ ton truck chassis, may be placed at set-ups along streams and water holes inaccessible to the cumbersome types of sprayers formerly in general use.

Control measures in Granby-Simsbury-Canton area found to be effective.--The creosoting and thinning work performed in this area has resulted in greatly reducing the spread of small caterpillars this spring; therefore the areas that have been sprayed will be in very much better condition in the immediate future.

Theft of hose couplings.--Early in the month a report was received from Pennsylvania to the effect that hose couplings had been cut off from some 18 lengths of spray hose which had been piled in a woodland at a location where spraying was under way. Some of them were recovered at a junk yard after investigation by the local police.

Progress of gypsy moth spraying work.--During May foliage development was slow, because of the late season, and as the end of the month approached, it appeared that it would be necessary to delay the spraying, as leaves would not be sufficiently developed to hold the spray well. However, during the last week of the month the foliage developed rapidly and it was possible to begin spraying on June 1 at many places in New England and Pennsylvania. Thirteen spraying machines were started in Massachusetts, 12 in Connecticut, and 35 in Pennsylvania. Later an additional machine was placed in commission in Massachusetts. Of the 12 machines assigned to Connecticut, 7 were operated for a considerable period on the double-shift basis and in Pennsylvania 22 were thus operated. By this arrangement, whereby each machine is operated by 2 crews working consecutively on 6-hour shifts, 12 hours of spraying each day can be accomplished, in contrast to the usual 8-hour performance for those operating under the single-shift arrangement. A considerable number of sections selected for spraying were a long distance from possible sprayer set-ups, necessitating the laying of long hose lines. This, coupled with the fact that the supply of hose was quite limited, made it necessary to delay spraying in some of them until hose could be transferred from other sections which were partially completed. Spraying work progressed very satisfactorily as a whole. The supply of arsenate of lead was less than was needed to cover all of the area selected for spraying, therefore not all of the spraying machines available were used during the entire season. In the Pennsylvania infested area, because of this shortage, spraying had to be discontinued before the end of June. Owing to a rather continued absence of rain prior to and during the spraying season, many of the streams which usually provide an adequate water supply dried up so that it became necessary to change sprayer set-ups and to shift hose lines. Notwithstanding difficulties, more than 11,000 acres of woodland were sprayed in

LIBRARY
STATE PLANT BOARD

Vermont, Massachusetts, Connecticut, and Pennsylvania. All spraying work had to be discontinued in June before the end of the month to avoid having the W. P. A. employees exceed the number of hours allowed in their employment schedules. Most of the spraying was discontinued about June 20 so that sufficient time could be allowed to assemble and store spraying materials and equipment before the end of the working period for the month.

PLANT DISEASE CONTROL

Survey completed on 955 square miles in Minnesota.--L. W. Melander, in charge of barberry eradication in Minnesota, reports that Federal and State W. P. A. crews have made an intensive survey of 955 square miles in central Minnesota counties since January 1. The following table summarizes the results of this work.

County	Area covered	New properties	Bushes and seedlings	
			Planted	Escaped
	Sq. mi.	Number	Number	Number
Carver	124-1/3	10	--	125
Rice	274-1/4	25	8	65
Scott	125-1/2	11	4	120
Sherburne	22-1/4	3	--	34
Washington	29-1/2	--	4	530
Winona	101-1/8	3	--	5
Wright	252-1/4	20	25	830
Miscellaneous				
Brown	--	1	1	--
Dakota	--	1	--	1
Goodhue	--	1	1	--
Sibley	16-1/2	--	--	--
Total	945-17/24	75	43	1,710

Berberis canadensis found in Shannon County, Mo.--George M. Frandsen, barberry-eradication leader in Missouri, reports having made an investigation of an area infested with Berberis canadensis in Shannon County. This species of barberry is found only occasionally in Midwestern States. A description of the area is as follows: Shannon County is in southwestern Missouri and the point at which Berberis canadensis bushes were found is about 2½ miles east of the point where Howell, Shannon, and Texas Counties join. The area was not extensive. Plants were found growing near the top of Jam Up Bluff. Only a few hundred plants, many of them 12 to 15 inches in height, were found. The tallest did not exceed 4 feet in height. Mr. Frandsen examined this area on April 21 but reported that leaves were just appearing and no rust infection was present.

W. P. A. labor destroys 53,000 barberry bushes in Iowa.--Control work accomplished with W. P. A. crews in Iowa during the last 4 years may be briefly summarized as follows: D. R. Shepherd, State leader in Iowa, reports that an intensive survey has been completed in an area comprising 22,300 square miles in 52 counties. This work has resulted in the eradication of more than 53,000 rust-susceptible barberry bushes on 2,277 different properties. According to Mr. Shepherd, much of the work done by

W. P. A. laborers during this period has been in those parts of the State where the rough topography, heavy timber, and dense undergrowth had made survey with smaller crews in years past impracticable and ineffective. In conjunction with the regular survey, 2,708 properties from which bushes had been previously removed, were reinspected. Barberry bushes were found on 21 percent of them.

Interbureau cooperation on blister rust training program.--In order better to equip regular Forest Service personnel, all temporary blister rust supervisors and the C. C. C., W. P. A., and regular blister rust workers for their season's work, the Forest Service and the Bureau of Entomology and Plant Quarantine conducted a program of intensive training and schooling in blister rust and its control during the latter part of May and the early part of June in the western white pine region. An illustrated lecture, with colored lantern slides, was given in each camp. Supplementing this are bulletins and manuals that give more complete information, field inspections of the rust on pine and Ribes, and training in control work.

More than 10,000 employees engaged in control of grain rust and white pine blister rust.--On June 14, relief employment on the Federal blister rust control project reached 5,022, the highest level since October 1936, according to reports from the regional leaders. The number of employees on emergency funds in the Division of Plant Disease Control totaled 7,584 in the Federal barberry-eradication and blister rust control projects during that week. There was a moderate increase later in the month, but a falling off is anticipated by the end of July in response to a reduction in appropriations. Several thousand additional laborers paid by cooperating organizations, State W. P. A. projects, and C. C. C. camps are also working on the control of grain rust and of white pine blister rust, therefore the Division is supervising over 10,000 men on the 2 projects this summer.

H. M. Cowling cooperates in aerial mapping.--Assisting in a Forest Service, A. A. A., and S. C. S. cooperative aerial mapping project in eastern Oregon, H. M. Cowling, regional blister rust photographer who is an experienced aerial photographer with the 116th Observation Squadron, Washington National Guard, reports that 1,000 square miles were photographed in 4 flying days. The major purpose of this work is to develop a complete and accurate map of the Umatilla and Malheur National Forests and the adjacent territory. Flying at 18,000 feet elevation, the area is stripped, each strip yielding a series of pictures with each overlapping the next by 60 percent. Adjacent strip overlay is about 30 percent. This method gives fine mapping detail when only the center of a picture showing a 2 by 3 mile area is used. The pictures are taken with a 42-pound camera on film rolls that produce 110 pictures 7 by 9 inches each. Working in heavy wool-lined flying suits at a temperature of 8° above zero, with mental facilities somewhat sluggish notwithstanding constant intake of oxygen from tanks, a full day's work is 7 hours in the air. Owing to the lack of darkroom facilities in the ship for reloading film magazines, the maximum day's production was 3 rolls.

Methods-development work in sugar pine region.--Methods-development work was carried on during May on the Sierra and Plumas National Forests.

On the Sierra Forest this work included eradication of Ribes cereum and R. roezli by means of the horse-drawn plow, eradication of large and troublesome R. roezli, R. cereum, and R. nevadense bushes by blasting with 20 percent and 25 percent dynamite, and testing and demonstrating the new pronged mattock for work on R. roezli. On the Plumas National Forest the regular bulldozer was tested in upland type for the eradication of R. roezli. These tests were made in heavy brush along abandoned railroad rights-of-way and in upland grassy areas. The bulldozer, although not of the type essentially designed for work in upland areas, did satisfactory work under all conditions tested. Observations showed that a small unit, probably one of the caterpillar D-2 type bulldozers, equipped with a hoisting winch from which a cable and several tag lines could be operated, would be well adapted to work in upland areas.

Pine disease survey in western white pine region.--A pine disease survey carried on during May on the Mount Spokane and Couer d'Alene operations showed the following results:

Operation	Drainage	Chains	White pine			Cankers	
			Examined	Infected	Infected	Total	Per 100 trees
		Number	Number	Number	Percent	Number	Number
Mt. Spokane---	Spirit Creek and Fish Creek	3,073	24,406	401	1.6	1,018	4.2
Coeur d'Alene-	Scott Creek and Silver Creek	165	1,868	1,105	59.1	11,956	640.0

Although the percentage of infection on the Idaho side of the Mount Spokane Operation is quite small when an average is taken for all of the Spirit Creek drainage, very heavy spots of infection were found in certain townships. As the Fish Creek area represented an older and more dense type than that found on Spirit Creek, only stream scouting was performed there. Only one small spot of infection was found. In view of the high percentage of infection on the Scott-Silver Creek area on the Coeur d'Alene operation, and the extremely high canker count, which represents a high damage rate on the very small trees found, it was deemed impracticable to control the rust on this area.

Uredinial stage of blister rust reported in New England States.--State Leader Perry of Massachusetts reports having found the first evidence of the uredinial stage of blister rust for the 1939 season on Ribes cynosbati in Shelburne, Mass., on June 7. Alton Miller, of Connecticut, reports having found first uredinia on June 2 in Goshen.

COTTON INSECT INVESTIGATIONS

Cotton-insect laboratory established at Waco, Tex.--A laboratory of the division was established at Waco, Tex., when K. P. Ewing was transferred from Port Lavaca to Waco on March 23, R. W. Moreland was transferred from College Station, Tex., on June 13 and P. A. Glick from Tifton, Ga., on June 16. The Waco laboratory will be field headquarters for cotton flea hopper and bollworm investigations. Since 1933 most of the flea hopper investigations have been conducted at Port Lavaca and that for this year will continue as a seasonal sublaboratory of the Waco laboratory. Most of the bollworm investigations have been conducted at College Station, in cooperation with the Texas Agricultural Experiment Station. The experiment station will continue these investigations but most of the Bureau's investigations relating to the bollworm will be conducted from the Waco laboratory. The laboratory is located on U. S. Highway No. 77 adjoining the Circle on the southern edge of Waco. The Bureau has leased 3 acres of land, an office and laboratory building, a garage, and a warehouse, and has erected an insectary. The insectary was completed on May 31. The other buildings were accepted on June 7. The laboratory also has two rooms in the Post Office Building, which will be used in connection with a cooperative project with the Soil Conservation Service at their Blacklands Experimental Watershed. This project is a study of the relation of soil conservation practices to cotton-insect populations. Special consideration will be given to the cotton flea hopper and the bollworm, but studies will also be made of the boll weevil, leaf worm, thrips, aphids, cutworms, and other insects.

Cotton root aphids.--Experiments on control of the cotton root aphids have been reported upon by F. F. Bondy and C. F. Rainwater, of Florence, S. C. Three species of aphids, Anuraphis maidi-radicis (Forbes), Rhopalosiphum subterraneum Mason, and Trifidaphis phaseoli Pass., were present, either singly or in combination, on the roots. Where T. phaseoli was present the damage to cotton was always severe but where only the other two species were present the damage was usually light. Cotton on land following corn or watermelons and peas, was again much more seriously attacked by root aphids than when following cotton, tobacco, or small grains. Cowpeas or soybeans are usually interplanted with corn, and serve as late host plants for the aphids, especially T. phaseoli. Where legumes are not planted in the corn there is usually a heavy growth of weed hosts, whereas cotton and tobacco are more cleanly cultivated late in the season. In some fields the degrees of damage following different crops could be noted to the exact row. Attempts to control the aphids were by applying (1) repellents for the attendant cornfield ants (Lasius sp.) to the soil before planting; (2) repellents for ants to the soil after planting and the aphid infestation had developed; (3) poisons for the ants; (4) soil fumigants for aphids and ants. The repellents used before planting were mixed with bone meal and those after planting with ground tobacco stems, as carriers. The repellents tested were kerosene, 1 quart; oil of sassafras, ¼ pint; oil of anise, ¼ pint; oil of tansy, 1/8 pint; oil of lemon, ¼ pint; tincture of asafetida, ¼ pint. These were mixed with small amounts of alcohol or water, 10 pounds of each of the carriers, and applied to 1/80-acre plots. The effects of the repellents were measured by the number of ant hills around the plants, although this did not prove entirely satisfactory because some were destroyed by cultivation. None of the repellents applied either before or after planting were effective. Tincture of asafetida was better than the others. The ant poisons used were varying quantities of thallium sulphate, thallium acetate, and tartar emetic in sweetened baits, made with sugar and honey, or sugar and sirup. The poisons were exposed by absorbing on strips of blotting paper and placing the strips on the surface of the soil and in perforated tin cans, and on sponges placed in cans. When the strips containing poison were exposed on the surface of the ground the ants began to feed immediately and in about 5 minutes the strips were covered with ants, whereas it was about 30 minutes before they began to feed on the strips or sponges in the tins. The strips placed on the ground dried out rapidly, soon became covered with dirt, and were ineffective after a short time. With tartar emetic, however, only a short time was required for the poison to be effective, and after 12 hours no ants, either dead or alive, could be found around the strips or in the ground around the plants. Presumably they died in their nests, which were deeper in the soil than the plants. Tartar emetic was more effective than either of the other two poisons and was equally as effective when 2 ounces were mixed with 1 gallon of water, 1 pound of sugar, and 2 ounces of honey as when mixed with 1 quart of water, ½ pound of sugar, and 1 ounce of honey. Thallium acetate appeared to be slightly more effective than thallium sulphate. Both were more effective when 100 grains were used with 1 pound of sugar, 3 ounces of honey, and 1 pint of water, than at weaker concentrations. More species of ants were attracted to the thallium poisons than to the tartar emetic, probably because of the higher concentrations of sweets than in the tartar emetic formulae. Apparently a high concentration of sweets is not necessary to attract the cornfield ant. The soil fumigants used were ethylene dichloride and dichlorethyl ether, emulsified with fish-oil soap and water. From 1 to 3 pints of ethylene dichloride, a pint of fish-oil soap, and 6-8 pints of water made excellent emulsions, but from 10 to 40 cc. of dichlorethyl ether with 1 pint of soap and 9 pints of water did not emulsify satisfactorily. Both emulsions were applied in a solid stream to the soil at the base of the plants with a knapsack sprayer at the rate of approximately 40 gallons per acre. Neither of the materials had any apparent ill effect on the cotton when applied to the soil but both caused burning when applied to the leaves. Also neither material, at the strengths used, was effective in controlling the ants or the aphids. There seems to be a relationship between the presence of root aphids, particularly *T. phaseoli*, and diseases of cotton seedlings. Stunted or dead plants showing lesions indicative of a disease nearly always have *T. phaseoli* present and the areas in which the disease is most prevalent are also the areas where the root aphids are most abundant.

Adults of false wireworm *Eleodes* sp. controlled by poison bran mash.--On May 23 the Bureau was informed that beetles were destroying young cotton plants on several farms near Vancourt, Tom Green County, Tex. Under date of May 26, R. P. Reppert, extension entomologist, College Station, Tex., reported that the insects destroying the cotton in Tom Green County were adults of *Eleodes* sp. W. I. Marschall, county agent, San Angelo, Tex., reported that C. S. Callahan, of Vancourt, who was threatened with the loss of his cotton crop because of the beetles, "was enthusiastic about the results of the poison-bran-mash formula in the control of these beetles." He stated that this insect appeared to be very fond of the poisoned bran. He noted that during the first 24 hours after the distribution of the mash the mortality among the beetles was not high but that the beetles were still taking the poison the third day after it was applied. An examination of the field at that time showed as many as 20 dead beetles on the ground under 1 weed. On a space less than 1½ inches square there were 5 dead beetles. Mr. Callahan used 400 pounds of bran mash on 80 acres of ground. He poisoned 4 rows and skipped 2, and is of the opinion that the poison can be placed more thinly, as it seems to attract the insects. He states that this is the easiest insect pest to destroy that he has ever worked with in his experience as a farmer. The poison-bran-mash formula used calls for slightly more sirup than generally used in making the poison for grasshopper control.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Inspection in the lower Rio Grande Valley.--In this semitropical area of Texas, designated as the lower Rio Grande Valley district, which has been under regulation on account of pink bollworm infestation since 1936, cotton is usually planted during the latter part of January and February and the harvesting of the crop is, as a rule, completed about the latter part of August. The 1939 cotton season in this valley was opened with the ginning of the first bale on June 11 from Starr County. On June 30, 55 gins were in operation and had produced 709 bales of cotton. Bloom inspection, which was begun on the first of May, to determine the degree of pink bollworm infestation in that district, was continued on into June. As reported last month, a rather heavy infestation was found in the Brownsville area, which was known to be infested last season. Picking of all rosette blooms in the 2 most heavily infested fields--the A. Leal and the Lozano Banco--was discontinued on June 20, as it was believed the green bolls in those fields had reached the stage where they were more attractive to the pink bollworm than the blooms. During the period June 1 to 20, a total of 1,072 specimens were taken from blooms in these 2 fields, making a grand total of 1,836 specimens of the pink bollworm taken from those 2 farms since May 1. Additional bloom inspections were made in Cameron County in June in the immediate vicinity and adjacent to the 2 heavily infested fields. A total of 266,916 blooms were examined from 24 fields. One additional infestation was discovered on June 16, from a field located 1/2 mile south of Brownsville, bringing the total number of known infested fields in Cameron County to 12, 9 miscellaneous infested fields, in addition to the 2 heavily infested ones, having been found in May. These findings indicated that a much heavier pink bollworm infestation existed in Cameron County in the 1939 crop than was present during the last season. On June 2 a casual inspection of green bolls in the Leal and Lozano fields resulted in the finding of 4 first-instar larvae. This was the first green-boll infestation to be reported this season. On June 8, 100 green bolls were collected from each of 9 known infested fields to determine the percentage of green-boll infestation. Seven of these fields showed no infestation, while 1 showed a 1-percent infestation, and the Leal field, known to be the most heavily infested, showed a 6-percent infestation. Early in June the A. Leal and Lozano Banco fields were declared a public menace by the Governor of Texas, and it was the intention of the State to purchase the cotton crop on those fields with existing funds and destroy it. On June 20 the Attorney General rendered an opinion to the effect that previously appropriated funds could not be used by the State for the purchase of this cotton; hence, these fields were not destroyed.

Conditions in the Big Bend.--Activities in connection with the 2-year program in the Presidio section of the Big Bend of Texas, carried on in an effort to reduce the heavy pink bollworm infestation in that area, were brought to a conclusion at the end of May. Similar control measures practiced by the Mexican Department of Agriculture in the Ojinaga region across the Rio Grande from Presidio were completed about June 10. This program consisted of the early harvesting of the 1938 cotton crop, followed immediately thereafter by the cleaning of fields, with a delayed planting date for the 1939 cotton crop and the destruction of all stub or volunteer cotton, in order to create a starvation period for all pink bollworms emerging prior to the fruiting of the main cotton crop. It is believed that practically all moth emergence was over in that area by June 8, and no blooms were found in cotton before June 17, thus creating a long period of suicidal emergence. Results of inspection of material from the 1939 cotton crop in both the Presidio and Ojinaga areas of the Big Bend are therefore awaited with much interest, in order to determine the effectiveness of these measures in reducing the heavy infestation in that region.

The situation in Arizona.--The general condition of the cotton crop in Pinal and Pima Counties, and that part of Maricopa County affected by the control program, which was brought to a close on May 31, looks very favorable for good results to be realized from our efforts to eradicate the pink bollworm from that area. The maturity of the cotton crop was held back through volunteer cooperation by the farmers, either by delayed planting, withholding water, or both, and, with the exception of a few scattered spots, all stub cotton was eliminated from the areas affected. It is not believed that there was sufficient cotton in fruit in Maricopa and Pinal Counties to propagate the pink bollworm before June 20. In both of these counties, within a distance of 14 miles of known infested spots, all volunteer plants were destroyed before reaching the fruiting stage, which has undoubtedly created a starvation period for emerging pink bollworm moths over several months' duration, and should bring about a marked reduction in infestation in the 1939 crop. In that part of Maricopa County not included in the control program, cotton was rather heavily fruited at the end of the month, with some of the earlier planted fields showing almost full-grown bolls. South of the Salt River, open bolls had been found before the close of June in stub cotton located just west of the Tempe Branch of the Southern Pacific Railroad, an area not affected by the control program and considered the boundary line of the known infested area. This is in striking contrast to nearby fields, lying within the regulated area, which had just begun to show squares and blooms at the end of June. Thus the comparison affords a good idea of the importance of the measures carried out in the spring activities.

Wild-cotton-eradication work in southern Florida.--Wild-cotton-eradication work has been carried on each season in southern Florida since the discovery of the pink bollworm in that area in 1932. The wild cotton plant provides a host for the pink bollworm and it is essential that it be eradicated so as to deprive this insect of material on which to propagate, and thus prevent its spread to commercial cotton plantings in northern Florida and southern Georgia and on into the main Cotton Belt. Funds to carry on this activity are provided for by the Work Projects Administration, together with funds allotted by this Bureau. No work is attempted in that area during the summer months because of climatic conditions, and this program was brought to a close on June 9. At this time only W. P. A. labor was being used. During the last days of the work a hurried check-up was made on some of the most difficult colonies. For the most part only very small seedling plants were found, those having sprung up since the rainy season started. However, in the Key Largo section 113 fruiting plants were found and destroyed during the period worked in June. Only 16 additional fruiting plants were found in the remainder of the entire district. Approximately 1,422 acres was recleaned and 14,824 seedling plants were destroyed during the portion of the month worked.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Cryolite controls hornworms on cigar-binder tobacco.--Tests conducted by F. S. Chamberlin and A. H. Madden, of the Quincy, Fla., laboratory, to determine the relative toxicity of cryolite and a paris green-lime (1-6) mixture to the hornworms Protoparce sexta (Johan.) and P. quinquemaculata (Haw.), on cigar-binder tobacco, demonstrated that cryolite-dust mixture applied to plots of cigar-binder tobacco throughout the infestation period of approximately 7 weeks exerted a more effective control of hornworms than did the standard paris green-lime mixture; that cryolite caused only the slightest traces of foliage burning, whereas the paris green-lime mixture damaged the leaves appreciably; and the cryolite washed readily from the foliage and apparently will cause little objectionable discoloration on the cured product. In view of the particular use to which cigar-binder tobacco is put, the results obtained in these tests indicate that cryolite offers a more satisfactory control of hornworms on this type of tobacco than does the standard paris green-lime mixture. It was noted, however, during the course of these tests, that the physical character of the cryolite must be improved before it can be used successfully in the dust form by growers in the Florida tobacco-producing area.

Relative toxicity experiments against cabbage caterpillars.--C. E. Smith, of the Baton Rouge, La., laboratory, and W. J. Reid, of the Charleston, S. C., laboratory, conducted tests against the three common species of cabbage caterpillars--the imported cabbage worm, the cabbage looper, and the diamondback moth--using four insecticides, i. e., pyrethrum-talc (1-2); derris-dust mixtures containing 0.5 and 1.0 percent of rotenone, respectively; and a combination of derris-pyrethrum (0.5 percent rotenone and 0.2 percent total pyrethrins), applied at 7-, 10-, and 14-day intervals. The results indicated that pyrethrum was more effective than derris for the cabbage looper, while the reverse was true for the other two species. The combination of derris and pyrethrum was most satisfactory for the three species as a whole, and resulted in the best yields. While no differences could be detected between the 7-day and 10-day applications, it was demonstrated that both were decidedly more effective than the 14-day applications.

Strawberry weevil feeds on wide range of wild host plants.--In investigations conducted on the Eastern Shore of Maryland during the spring and early summer of 1939 by W. A. Thomas, of the Chadbourn, N. C., laboratory, it was found that the new generation of Anthonomus signatus Say began emerging from the pupal stage during the last week of May. These early individuals began feeding heavily on the flowers of wild cherry, blackberry, dewberry, and yellow cinquefoil. During the third week of June, near the peak of emergence, the weevils were observed feeding heavily on the flowers of wild rose, elderberry, wild carrot, and yarrow, or milfoil. They were taken from an unidentified water plant in large numbers near Willard, Md. They were also taken in smaller numbers from a species of late-blooming huckleberry, milkweed, white elder, sumac, and a single specimen from a species of laurel. The members of the new generation of weevils were still abundant in the strawberry fields, where they were observed on the strawberry foliage, but there were no indications that they were feeding on it.

Wireworms in Pacific Northwest fail to reproduce parthenogenetically.--Tests conducted by M. C. Lane, of the Walla Walla, Wash., laboratory, with 260 female beetles of *Limonius canus* Lec., and 50 of *L. californicus* Mann., demonstrated that, although 77 percent of the former and 32 percent of the latter species laid eggs, none of these hatched, which indicates that the possibility of parthenogenesis in the females of either species is very slight. It is interesting to note in these tests that the unmated females lay relatively small numbers of eggs, most of them only from 5 to 10.

Oregon pea growers sweep fields in pea weevil control program.--J. C. Chamberlin, of the Corvallis, Oreg., laboratory, reports that 73 growers of Austrian winter field peas, representing 2,424 acres, attended sweeping demonstrations, sponsored by County Agent W. F. Cyrus, of Washington County, to receive instructions on how to check their fields for pea weevil infestations in order to determine the necessity for and the extent to which a given field should be dusted. These demonstrations were held at 4 localities in the county. Most of the growers later obtained insect nets and swept their own fields, both as a guide to dusting operations and as a check on results. Many of these growers volunteered to keep records of their observations and to turn over duplicates to Bureau workers.

Glycerine and tartar emetic effective against red spider.--In laboratory tests conducted by C. A. Weigel and G. V. Johnson, of the Beltsville, Md., laboratory, against *Tetranychus telarius* (L.) on chrysanthemum cuttings, it was shown that glycerine and tartar emetic gave a mortality equal to that obtained with brown sugar and tartar emetic. Other materials substituted for brown sugar, including sodium oleyl sulphate, sodium oleyl sulphate plus synthetic resins, and sodium lauryl sulphate, as well as a proprietary compound containing derris, lethane, pine oil, petroleum, and an emulsifier, resulted in much lower mortalities.

INSECTS AFFECTING MAN AND ANIMALS

Effectiveness of derris washes on cattle grubs.--Results of experiments conducted by R. W. Wells and H. O. Schroeder, on the control of cattle grubs, indicate that derris washes consisting of 8 and 12 ounces of derris to the gallon of water, plus 4 ounces of soap, applied at the rate of 1/3 quart per animal, are less toxic to *Hypoderma bovis* (Deg.) than to *Hypoderma lineatum* (De Vill.). In the former species the third-instar larvae were more resistant to the washes than were the second instar, while with the latter species the reverse is the case. Hand rubbing of the backs of the animals after the application of the insecticide is more effective in killing *H. lineata* larvae than brush rubbing, but in treating animals infested with *H. bovis*, brush rubbing is just as effective as hand rubbing.

Resistance of American dog tick to derris dips.--C. N. Smith reporting on laboratory tests with derris powder dips (derris 2 ounces, water 1 gallon, and soap or other wetting agent 1 ounce), states that used against the adult ticks none of the mixtures will kill the inactive stages: 16 percent of the females and 33 percent of the males active but unfed in nature were killed; 92 percent of fed males and slightly engorged and fully engorged females were killed, as were 44 percent of females one-eighth to one-third engorged, and 50 percent of the females one-half engorged.

Home-made pyrethrum livestock spray.--Craig Eagleson, of the Dallas, Tex. laboratory, reports that a home-made pyrethrum livestock spray containing 100 milligrams pyrethrins per 100 cc. can be prepared by using 20-to-1 commercial concentrated pyrethrum extract diluted with high grade kerosene at a cost of 34 cents per gallon. This spray is fully as toxic to flies attacking livestock as commercial pyrethrum sprays of the same pyrethrin content, which cost approximately twice the amount.

Large quantities of Chaoborus caught in traps.--A. W. Lindquist, of the Nice, Calif., laboratory, reports that with a new type electric light suction trap devised at his station as high as 75 quarts, or 32 pounds, of Clear Lake gnats were caught in a single 3-hour collecting period.

Gambusia control larvae of Aedes aegypti in plant-nutrient solutions.--With the rapidly increasing use of nutrient solutions for plant culture, the problem has arisen of how to prevent mosquito breeding in such solutions. Because of the likelihood that the chemical might adversely affect the plants, it does not seem advisable to use these materials until more data are available regarding their effect on the nutrient solutions. G. H. Bradley and B. V. Travis, of the New Smyrna, Fla., laboratory, have found, however, that top minnows (Gambusia spp.) will apparently thrive in a solution used for growing tomatoes and will keep the solution free of Aedes aegypti larvae. The small fish would doubtless be equally effective in destroying other species of larvae.

FOREIGN PLANT QUARANTINES

Fruitfly larvae in baggage arrive from Mexico by airplane.--On June 11, 1939, a basket containing 45 figs, 12 sapotes, and 12 mangoes was intercepted in passenger's baggage from Mexico City at the Brownsville airport. The owner, a former Spanish diplomat, was very reluctant to relinquish the fruit, stating that he had picked it himself and he could not see how any harm could result from its importation. When the fruit was examined, 113 larvae of Anastrepha serpentina Wied. were taken from 11 of the sapotes. The twelfth sapote showed evidence of previous infestation.

Stopping them at the line.--Recently an automobile bearing a California license and pulling a large house trailer arrived on the bridge at Laredo. When asked if they had any fruits or plants from Mexico, the occupants of the car replied, "Only a few potatoes in the trailer." These were then turned over to the inspector. A thorough search of the trailer, however, brought to light seven apples and three oranges which had been concealed by the owners. A fine of $1 was assessed by Customs for petty smuggling. On May 15 a Mexican from Weslaco, Tex., was apprehended at the port of Hidalgo by Inspector A. L. Williamson as he was attempting to smuggle 30 plants into the United States from Mexico. The plants were confiscated and Customs assessed a fine of $10 for petty smuggling.

Bacterial disease of potatoes in South America.--Roberto Millan, of Argentina, while in the United States will study the ring rot disease (Bacterium sepedonicum Spieck.) which has recently been found affecting potatoes in several States, in an effort to determine whether or not it is the same disease that has recently been found on potatoes in Argentina. A. S. Muller, of Venezuela, who was in Washington the last of June, states that a new bacterial disease of potatoes has recently been found in Venezuela. It is hoped that he and Mr. Millan and potato pathologists in this country will be able to determine the identity of the South American disease or diseases. Argentina and Venezuela obtain seed potatoes from this country and Canada, hence both pathologists are interested in potato-disease conditions in the areas producing potatoes that may be exported to their respective countries.

Entomological interceptions of interest.--Two living larvae of the Mexican fruitfly (*Anastrepha ludens* Loew) were intercepted at Laredo, Tex., on April 12 in a ponderosa lemon in baggage from Mexico. Two living larvae of the cerambycid *Cyllene antennatus* White arrived at Brownsville, Tex., on February 13 in mesquite wood in cargo from Mexico. Specimens of the scale insect *Chionaspis euphorbiae* Brain were found at Washington, D. C., on October 5, 1938, on *Euphorbia triangularus* in the mail from the Union of South Africa. A living specimen of the cydnid *Geocnethus lugubris* (Stal) was intercepted at San Francisco on February 1 on an orchid (*Cattleya trianae*) in cargo from Colombia. A living larva of the pyralidid *Syngamia abruptalis* (Walk.) was collected on November 17, 1938, on *Ageratum* in the field at Dededo, Guam. A living adult of the chrysomelid *Pagria signata* (Mots.) arrived at Seattle, Wash., on February 24 with sphagnum moss used as packing material in the mail from Japan. Living specimens of the scale insect *Diaspis radicicola* Ferris were taken at El Paso, Tex., on November 23, 1938, on cacti in baggage from Mexico. A living larva of the danaid *Danaus menippe* (Hbn.) was collected on February 10 on milkweed (*Asclepias curassavica*) in the field at Corozal, P. R. A living specimen of the lygaeid *Cryphula trimaculata* (Dist.) was found at Nogales, Ariz., on February 25 on eggplant in cargo from Mexico. Five living pupae and one living adult of the West Indian sweetpotato weevil (*Euscepes postfasciatus* Fairm.) arrived at New Orleans on March 20 in sweetpotatoes in ship's stores from Trinidad. A living larva of the European corn borer (*Pyrausta nubilalis* Hbn.) was intercepted at New York on October 26, 1938, in an apple in baggage from Italy.

Pathological interceptions of interest.--*Cercospora musae* Zimm. was found on banana leaves used as packing in baggage from Trinidad on June 26. *Colletotrichum crotalariae* Petch was intercepted on pods of *Crotalaria* sp. on February 9 in baggage from St. Thomas, British West Indies. *Coniothyrium fuckelii* Sacc. was found on oranges from Italy on March 24. *Elsinoe australis* Bit. and Jenk. was found on April 26 on oranges from Brazil. *Gloeosporium helicis* Oud. was intercepted on plants of *Hedera helix* in baggage from Portugal on June 12. *Gloeosporium lebbek* Syd. was found on pods of *Albizzia lebbek* on March 13, in baggage from Bahamas. *Peronospora pisi* (de B.) Syd. was found in peas from France on May 29. *Phomopsis cocoes* Petch was found on husks of coconuts from St. Lucia on February 17. *Phyllosticta* sp., unlike any species described on *Codiaeum*, was found on leaves of that host from Bermuda on February 17. *Puccinia absinthii* (Hedw. f.) DC was intercepted on June 7 on *Artemisia longifolia* plants in baggage from Bermuda. *P. extensicola hieraciata* (Schw.) Arth. was found on lettuce from Holland on June 19. *Trematosphaeria cactorum* Earle was found on *Echinocactus anthonii* plants under special permit by mail from Mexico on May 31 at San Francisco. All of these interceptions except the last one were made at the port of New York.

DOMESTIC PLANT QUARANTINES

Grasshopper-bait shipments reach new record.--A new all-time peak has been reached this year in furnishing grasshopper bait to cooperating States, more than 236,000 tons having been made available. North Dakota has received the largest quantity, with Montana, Colorado, and Minnesota following in order.

Grasshopper control in Southern Great Plains.--The large-scale baiting operations which have been carried on this season for the long-winged migratory grasshopper in the Panhandles of Texas and Oklahoma and adjacent areas of Colorado, New Mexico, and Kansas have proved very effective. No extensive flights of these hoppers have been reported and it is believed that the serious-trouble stage has passed. The surveys showed where egg beds were located and enough bait has been spread to keep the population well below the danger point. A mortality rate of from 80 to 90 percent with one spreading was common. Baiting is continued in parts of the areas in July.

Grasshopper baiting in Northern Great Plains.--The lesser migratory hopper of the Northern Great Plains matured rapidly following rains the first half of June and by the 20th of the month work was under way, supplemented with Federal crews in Montana, North Dakota, South Dakota, Nebraska, and Wyoming. Prolonged rains, however, hampered the baiting operations. By the close of the month local dispersal flights were occurring in the direction of prevailing winds with heavy crop losses in localized areas, and 2,700 Federal workers and 1,300 Federal spreader units, in addition to thousands locally owned, were intensively working to save the crops. Most of the mixing stations in the area were operating on a 24-hour day. By the early part of July Federal crews and farmer spreader units, formerly assigned to baiting on idle and abandoned lands, were concentrated on immediate crop protection, as the hopper population on the unused lands was dwindling. Operations are continuing at full speed, with plenty of bait and generally good support from farmers. Notwithstanding flights and severe crop damages in limited areas, enormous acreages of crops are being protected.

Mormon cricket activities at height.--The drying of range plants in the early part of June caused Mormon crickets to invade cultivated lands en masse and control measures throughout the 9 States where operations are carried on were rapidly increased, reaching the peak of activities about the middle of the month. With the increased use of power dusters, making possible the dusting of large areas early in the season, effective control has been accomplished throughout the region as a whole. Excellent kills have been reported by supervisors of the various areas and crop losses were held to a minimum. Good cooperation has been received from farmers, the Forest Service, the Indian Service, and the C. C. C. Farmers and ranchers have expressed themselves as well satisfied with the results. By the close of June the cricket bands were greatly reduced and control work has, accordingly, been more difficult with the advance of the season. Canals and streams have dried up, precluding the use of oil-on-water as a barrier. Many miles of metal barrier are in use successfully holding marching crickets, and over 1,800 pit-traps have caught and destroyed countless thousands of crickets. The area dusted to the close of June totaled nearly 230,000 acres.

Mormon cricket infestations.--Throughout most of the infested States, Mormon crickets reached the adult stage earlier than in 1938 and oviposition, first reported on May 29, in Washington County, Idaho, was generally from 2 to 3 weeks earlier than last year. Early instar nymphs were still found in the higher altitudes by the latter part of June, however, necessitating continued control operations in July. A larger number of crickets than had been anticipated existed this year in several States, particularly in Nevada and in several counties in Oregon, Montana, Wyoming, and Utah. Nevada crews were hard pressed to prevent crop damage. Crop losses were for the most part held to isolated ranches. Damage to range plants was quite heavy in June in Nevada, Idaho, Oregon, and Montana. Certain range plants in the Whitman National Forest in Oregon were "stripped of all foliage and eaten to the ground." In many other areas of the infested States, however, crickets have not given the trouble anticipated.

Areas treated for white-fringed beetle.--Control activities in June were intensified in an earnest effort to destroy every white-fringed beetle possible at this period of emergence. All railroad rights-of-way in the infested areas were sprayed with herbicide at least once, some several times, killing the weeds in which beetles were likely to congregate. The work was accomplished with specially devised sprayers of as much as 8,000-gallon capacity and others of 600-gallon capacity mounted on trucks. Railroad companies assisted in the work. In the New Orleans area 770 miles of railroad trackage constituting all lines serving that city had been sprayed to the close of June. At Florala and Lockhart, Ala., the operators working in double shifts to take advantage of the fair weather put out as many as 21 loads a day. It was found possible to load a 400-gallon sprayer and have it ready to go in 4 minutes. At Mobile, Ala., repeated spraying was effective in keeping down the heavy growth of weeds on the area treated, with particularly encouraging results on areas that had been sprayed last year. The first application required 750 gallons to the acre; the second, 550 gallongs; and the third, 300 to 400 gallons. Dusting operations have been carried on in infested areas that were not sprayed, including the environs of 61 New Orleans nurseries and other localities where beetles were found in 1938. At Florala, Ala., 15 small dusters were supplied to farmers for treating their crops. In small isolated infestations fumigation, together with spraying and placing of dust barriers, is going forward in an effort toward eradication. The effectiveness of these suppressive measures is indicated by the fact that up to the first of July not a single adult beetle has been found at Mobile, Ala., Baton Rouge or Lake Arthur, La., or at 3 isolated points in Mississippi where infestations existed last year.

Inspection for white-fringed beetle.--Federal and State inspectors for the 4 infested States carried on inspection for the white-fringed beetle in June. A survey for larvae in the Florala, Ala., area showed an average of 14 larvae per square yard on 98 properties. In 3 known infested counties in the Monroeville, Ala., area, new infestations totaling 1,284 acres have been found this season.

White-fringed beetle quarantine restrictions modified.--Circular B. E. P. Q. 485 was revised, effective July 7, to extend the period of exemption from certification to February 1, 1940, of several restricted commodities when shipped from designated parts of the regulated areas in the four quarantined States.

Sweetpotato-weevil control activities.--Inspections for the sweetpotato weevil in the past year, in Alabama, Georgia, Mississippi, and Texas, jointly with inspectors of these States, brought to light 891 properties infested with the weevil. In the previous year 2,558 properties in these States had been found infested. Activities in June, this year, included the inspection of 341 properties, with 30 found infested, and the reinspection of over 1,000 properties in the quarantined areas. In addition, the Mississippi State inspectors are making a survey inspection of areas in 9 counties of that State. Eradication measures were carried on in localities of the 4 States, as well as regulatory work involving the removal of some illegal plantings.

Peach disease work.--Nearly 9,000 properties in 20 States have been inspected thus far this season for the phony peach and peach mosaic diseases. In June 98 Federal and 67 State and county inspectors worked on the project. Relief crews, totaling 967 men, removed diseased, abandoned, and infected peach trees.

Peach mosaic control.--Inspections in June for the peach mosaic disease were confined to orchards in seven known infected States. Decidedly fewer mosaic trees were found on the second inspections in California and Colorado than on second inspections of these areas in 1938. All diseased trees were removed from Mesa County, Colo., the heaviest infected area in that State, by June 30. This is the first time that a 100-percent removal has been accomplished in that area by this date. In Wilbarger County, Tex., the mosaic disease reappeared this year, the first since 1937. In Salt Lake County, Utah, where the disease existed in 1938, no mosaic was found this year.

Over 600 nurseries are phony-free.--Phony peach inspections in June were concentrated on peach nursery environs in 13 States. All phony trees found within the environs of nurseries were removed prior to June 30, making all inspected nurseries eligible for certification under requirements of the standardized State quarantines. The numbers of such nurseries, by States, are as follows:

Alabama	19	Mississippi	24
Arkansas	53	Missouri	6
Georgia	64	North Carolina	13
Indiana	1	South Carolina	8
Kentucky	3	Tennessee	199
Louisiana	10	Texas	204

Inspection work is still in progress in Illinois.

Citrus canker eradication.--The W. P. A. force working on the removal of abandoned and escaped citrus trees was increased to 201 in June. Working in the Houston, Tex., area, they destroyed 290,000 such trees. Five inspectors made inspections in June for citrus canker in Chambers, Harris, and Montgomery Counties, Tex., covering over 400 properties. No canker was found. Although most of the trees inspected are escaped *Citrus trifoliata*, several plantings of old abandoned trees have been located along the Houston ship channel and on large ranches in Harris County.

Farm produce inspected in transit.--Farm produce consigned from areas infested with the Japanese beetle and from those infested with the white-fringed beetle is receiving special attention at transit inspection points to determine whether such products have been certified at origin. Railway cars after being unloaded are inspected for the possible presence of either of these beetles. One live Japanese beetle was found at Cincinnati in a car of beans consigned from a point in Maryland. Arrangements have been effected in Chicago for the inspection of boats carrying any restricted products from the white-fringed beetle area. Shipments from the Japanese beetle area are also examined to see whether they are so covered as to prevent beetles from entering containers when passing through the infested area.

Violations intercepted.--Transit inspectors intercepted 295 apparent violations of Federal quarantines in June, and 6 were reported by California State inspectors. Boston inspectors reported several violations in the shipping of uncertified cut flowers to isolated points in the Japanese beetle area.

Sweetpotato-plant shipments.--A large volume of sweetpotato plants, certified under sweetpotato weevil quarantines, has been observed by the Atlanta transit inspector, who states that 130 million such plants have been shipped from Georgia this season, according to records.

CONTROL INVESTIGATIONS

Nicotine-atomizing apparatus for greenhouse fumigations.--Further tests by H. H. Richardson and J. W. Bulger, of the Beltsville, Md., laboratory, on the nicotine-atomizing apparatus for greenhouse fumigations have corroborated the results of last year. A maximum nicotine concentration of about 40 percent of the original dosage (1/16 oz. 40% nicotine per 1,000 cu. ft.) was obtained at 5 to 10 minutes from the start, but concentrations fell away rapidly so that little nicotine remained after the first hour. In an effort to increase efficiency various changes were tried to no avail.

INSECTICIDE INVESTIGATIONS

Particle size affects toxicity of sodium arsenite to Mormon cricket.--The question of the effect of particle size on the toxicity of sodium arsenite to the Mormon cricket (*Anabrus simplex* Hald.) has been investigated by O. A. Nelson of this Division, in cooperation with the Division of Domestic Plant Quarantines, the Division of Cereal and Forage Insect Investigations, and the Department of Entomology of the Montana Experiment Station. The experimental work was carried out in Montana. Commercial sodium arsenite was fractionated according to particle size, and test samples were made with several fillers. Tests on Mormon crickets have shown that finely subdivided sodium arsenite is much more toxic than is the coarser product. The effect of the different diluents is not as pronounced as that of the particle size of the poison, but the results indicate that where the diluent is exceedingly fine it forms a protective coating around the particle of the poison and retards its action. When finely divided sodium arsenite was mixed with a coarser diluent more rapid kills were obtained. A crude grade of sodium arsenite when finely ground was found to be equally as toxic as the purified white sodium arsenite. White arsenic (As_2O_3) showed little or no toxicity toward the Mormon cricket, regardless of fineness. Mr. Nelson has recently returned from Montana, where toxicological tests were carried out in cooperation with J. H. Pepper and Mr. Hastings of the Department of Entomology, Montana State College.

BEE CULTURE

Winter pollen reserves needed for spring brood rearing.--The value of winter pollen reserves has been further brought out by J. D. Hitchcock, of the Intermountain States Bee Culture laboratory, in a study on the pollen consumption of honeybees during winter. The following is taken from a summarized report of this work: "Pollen consumption occurred throughout the winter period in colonies with both abundant and negligible pollen reserves, but was considerably greater in the former and increased in March and April, whereas the colonies with negligible reserves showed a decrease in pollen consumption in these months. This reflected the greater brood-rearing activity of the colonies with abundant pollen reserves. In the process of reliquefying granulated honey, bees reduced its pollen count from 7,000 to 600 grains per cubic centimeter, but were unable to feed their brood adequately in the absence of stored pollen. Consumption of honey late in winter and early in spring was much greater in the colonies with pollen reserves, but wax secretion was similar in all. Pollen consumption did not appear to be influenced by parasitic infection with *Nosema* and *Malpighamoeba*, both parasites showing a marked increase early in spring." The reduction in the pollen content of the reliquefied honey is highly interesting because it bears out observations mentioned in the last number of the News Letter (v. 6, No. 7, pp. 35-36) on the rapidity with which pollen grains are removed from honey in the honey sacs of worker bees.

Optimum temperature for survival of bees in cages found to be 93.9°F.--A. W. Woodrow, of the Intermountain States Bee Culture laboratory, has been studying factors that influence the survival of bees in cages in order to develop standardized survival methods for adult bees. Some of his results from recent work on the effect of temperature are given in the following summarized report: "A series of experiments to study the effect of temperatures on caged bees, begun January 24, was completed May 10. Bees fed only water lived 3 days at 99.6°F., but at temperatures of 81.7° to 93.9° they lived from 4.1 to 5.1 days. Bees fed only 50-percent sucrose sirup lived 2.2 days at 99.6°, but at temperatures of 81.7° to 93.9° they lived from 38.4 to 67 days. When fed both 50-percent sucrose sirup and water they lived from 12.2 to 33.6 days at 99.6°. In general, they lived longer on 50-percent sucrose sirup and water at 93.9° than at lower or higher temperatures, indicating that this is about the most suitable temperature investigated. These tests were conducted with relative humidities ranging from 20.2 to 24.7 percent, which have previously been found to be nearly optimum for studies of caged bees."

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Mouth parts of the chigoe.--A study of the chigoe (*Tunga penetrans* (L.)), the aggravating flea pest of tropical countries, has revealed some rather interesting modifications of the mouth parts, as observed by H. E. Ewing and Irving Fox. Both the maxilla and the labial palpus are very much reduced, the former being withdrawn entirely into the head and the latter being apparently modified into a piercing structure having no setae and exhibiting indistinct segmentation. The labrum and the mandible are long and conspicuous and extend well beyond the trochanters of the first leg.

UNIVERSITY OF FLORIDA
3 1262 09244 4768

Distribution of recently described pentatomid.--Early in May, C. F. Hartung, of the Forest Service, submitted for determination a number of specimens of a pentatomid found hibernating in a house on St. George's Island, Md. These were identified by H. G. Barber as *Edessa florida* Barber, described in 1935 from specimens collected by H. S. Barber at Royal Palm Park, Fla. On May 21 many specimens were observed on the island feeding on the stems of the widely distributed plant *Convolvulus sepium* L. The species was previously known only from Florida.

Early records of lily-bulb thrips in United States.--The lily-bulb thrips (*Liothrips vaneeckei* Priesner) was described in 1920 by Priesner from a series of specimens collected June 28 and July 12, 1915, on *Lilium pardalinum* Kellogg in Holland. This species of thrips was found in the Pacific Northwest in 1930 and 1931 and notes on its distribution and habits were made by R. Schopp and C. F. Doucette, of this Bureau, who published their observations in 1932 (Jour. Econ. Ent. 25: 1016-1019). Mr. Schopp continued the study of *L. vaneeckei* and a paper by him giving the complete biology of this species appeared in 1936 (Jour. Econ. Ent. 29: 1099-1103). Apparently the earliest available record of *L. vaneeckei* in the United States pertains to an interception by the Division of Foreign Plant Quarantines on August 18, 1924. That the species was here several years earlier is verified by a series of specimens from three different localities found among some miscellaneous undetermined material that was recently identified by Floyd Andre and incorporated in the National Collection of thrips. The first series of slides was collected at Lawrence, Kans., in 1919 by S. J. Hunter from lily bulbs; the second at Martinsville, Ind., November 21, 1919, by F. N. Wallace on lily bulbs coming from Philadelphia, Pa.; and the third at New York, September 16, 1920, by A. J. Bruman on lily bulbs from France.

---oOo---